

## Claims

What is claimed is:

1. A method for matching advertisements to subscribers, the method comprising:

receiving advertisement profiles that include traits associated with an intended target

5 market for an associated advertisement;

gathering subscriber data from at least one source, wherein the subscriber data is selected from at least a subset of transactional data, public data, private data, and demographic data;

generating subscriber profiles based on at least a subset of gathered subscriber data, wherein the subscriber profiles predict traits about the subscribers without revealing any private data or raw transaction data associated with the subscribers;

correlating the advertisement profiles with the subscriber profiles; and

selecting targeted advertisements based on said correlating.

2. The method of claim 1, further comprising grouping subscribers having similar

15 subscriber profiles.

3. The method of claim 2, further comprising generating a group profile by averaging the subscriber profiles for all subscribers within the group, and wherein said correlating includes correlating the group profiles with the advertisement profiles.

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4. The method of claim 1, wherein said correlating includes forming subscriber groups for at least a subset of the advertisement profiles, each subscriber group including subscribers whose subscriber profiles are most similar to a respective advertisement profile.

5 5. The method of claim 1, wherein said gathering includes monitoring subscriber viewing activities.

6. The method of claim 5, wherein said generating includes aggregating the subscriber viewing activities to develop subscriber viewing characteristics.

7. The method of claim 5, wherein the subscriber viewing activities include at least some subset of channel changes, volume commands, record commands and EPG commands.

8. The method of claim 6, wherein the subscriber viewing characteristics include at least some subset of program preference, network preference, genre preference, volume preference, dwell time, and channel change frequency.

9. The method of claim 8, wherein the subscriber viewing characteristics are broken out by day part.

10. The method of claim 5, wherein said generating includes

retrieving heuristic rules associated with the subscriber viewing activities; and

applying the heuristic rules to the subscriber viewing activities to generate the subscriber profiles, wherein the subscriber profiles predict traits about the subscriber not captured in the subscriber viewing activities.

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11. The method of claim 6, wherein said generating further includes

retrieving heuristic rules associated with the subscriber viewing characteristics; and

applying heuristic rules to the subscriber viewing characteristics to generate the subscriber profiles, wherein the subscriber profiles predict traits about the subscriber not captured in the subscriber viewing characteristics.

12. The method of claim 6, wherein said generating further includes

retrieving heuristic rules associated with the subscriber viewing activities and the subscriber viewing characteristics; and

15 applying the heuristic rules to the subscriber viewing activities and the subscriber viewing characteristics to generate the subscriber profiles, wherein the subscriber profiles predict traits about the subscriber not captured in the subscriber viewing activities or the subscriber viewing characteristics.

20 13. The method of claim 1, wherein the subscriber profiles include probabilistic demographic traits of the subscribers.

14. The method of claim 1, wherein said generating includes retrieving heuristic rules associated with transactional data gathered for the subscribers, wherein the heuristic rules identify traits likely associated with the subscribers performing those transactions.

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15. The method of claim 14, wherein the heuristic rules identify traits not readily identifiable with the transaction data.

16. The method of claim 14, wherein the heuristic rules identify demographic traits.

17. The method of claim 1, wherein said gathering includes gathering information from a plurality of distributed databases.

18. The method of claim 17, wherein the plurality of distributed databases includes at least some subset of viewing characteristics, purchasing characteristics, transaction characteristics, statistical information and deterministic information.

19. The method of claim 1, wherein said generating includes generating subscriber profiles in the form of a ket vector.

20. The method of claim 19, wherein the ket vector is represented by:

$$|A\rangle = (a_1\rho_1 + a_2\rho_2 + \dots a_n\rho_n)$$

$$+ (b_1\sigma_1 + b_2\sigma_2 + \dots b_n\sigma_n)$$

$$+ \dots$$

$$+ (m_1\omega_1 + m_2\omega_2 + \dots m_n\omega_n)$$

5 wherein  $a_1$  through  $m_n$  represent weighting factors and  $\rho_1$  through  $\omega_n$  are identification factors selected from at least a subset of viewing characteristics, purchasing characteristics, transaction characteristics, statistical information and deterministic information.

21. The method of claim 19, wherein said correlating includes applying an operator to the subscriber profiles to determine if an advertisement is applicable to associated subscribers.

22. The method of claim 1, wherein said correlating is performed by a secure correlation server.

15 23. The method of claim 1, wherein said correlating is done by each subscriber.

24. The method of claim 1, further comprising presenting the targeted advertisements to the subscribers.

25. The method of claim 24, wherein said presenting includes presenting the targeted advertisements in avails within program streams.

26. The method of claim 25, wherein the program streams are video program streams.

27. The method of claim 26, wherein the video program streams are television program streams.

28. The method of claim 25, wherein said presenting includes generating at least one presentation stream for each program stream by inserting targeted advertisements in place of default advertisements within the program streams; and delivering the presentation streams to the subscribers.

29. The method of claim 28, wherein said generating at least one presentation stream is performed at a cable television head-end.

30. The method of claim 29, wherein said generating at least one presentation stream includes generating a single presentation stream and said delivering includes delivering the single presentation stream to each node connected to the head-end.

31. The method of claim 29, wherein said delivering includes delivering each node connected to the head-end a presentation stream that is targeted thereto.

32. The method of claim 31, wherein each node receives only a single targeted presentation stream for each program stream.

33. The method of claim 29, further comprising grouping nodes having similar profiles together to form a node cluster, and wherein said delivering includes delivering each node within the node cluster the same presentation stream.

34. The method of claim 34, wherein said grouping nodes is not restrained by geographic proximity.

35. The method of claim 33, further comprising generating a node profile by averaging the subscriber profiles for each subscriber connected to the node.

36. The method of claim 29, wherein said delivering includes delivering multiple presentation streams associated with a single program stream to each node connected to the head-end, selecting the appropriate presentation stream for each node, and delivering the appropriate presentation stream to the subscribers connected to each node.

37. The method of claim 36, wherein said delivering multiple presentation streams includes delivering each of the multiple presentation streams at different frequencies, statistically multiplexed together at a single frequency, or at different wavelengths.

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38. The method of claim 29, wherein said delivering includes delivering multiple presentation streams associated with a single program stream to each node connected to the head-end,

selecting the appropriate presentation stream for each branch of each node, and

delivering the appropriate presentation stream to the subscribers connected to each branch.

39. The method of claim 38, wherein

said delivering multiple presentation streams includes delivering each of the multiple presentation streams at different frequencies, and

said selecting includes mapping the frequency of the presentation streams to appropriate branches.

40. The method of claim 38, wherein

said delivering multiple presentation streams includes delivering each of the multiple presentation streams statistically multiplexed together at a single frequency; and



said selecting includes demodulating the statistically multiplexed presentation streams, routing the demodulated presentation streams, and modulating the routed presentation streams to appropriate branches.

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41. The method of claim 38, wherein

said delivering multiple presentation streams includes delivering each of the multiple presentation streams at a single frequency and different wavelengths; and

said selecting includes demultiplexing the presentation streams and forwarding the different wavelength presentation streams to appropriate branches.

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42. The method of claim 28, wherein said generating at least one presentation stream is performed at a cable television node.

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43. The method of claim 28, wherein said delivering includes delivering, to each subscriber, a single targeted presentation stream for each program stream.

44. The method of claim 28, wherein said delivering includes delivering, to each subscriber, a plurality of presentation streams for each program stream, and further comprising selecting the appropriate presentation stream for display to the subscriber.

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45. The method of claim 24, wherein said presenting the targeted advertisements includes

delivering a plurality of targeted advertisements to each subscriber; and

inserting the targeted advertisements within advertisement opportunities in delivered

5 program streams.

46. The method of claim 45, wherein said inserting includes inserting the targeted advertisements based on a queue.

47. The method of claim 46, wherein the queue is delivered to the subscriber.

48. The method of claim 47, further comprising storing the targeted advertisements and the queue.

49. The method of claim 48, wherein a PVR receives the program streams, the targeted advertisements, and the queue, stores the targeted advertisements and the queue, and inserts the targeted advertisements in the program streams based on the queue.

50. The method of claim 24, wherein said presenting the targeted advertisements includes

delivering a plurality of advertisements to each subscriber;

delivering an advertisement profile for each of the plurality of advertisements;

determining if each of the advertisements is applicable by correlating the associated advertisement profile with the subscriber profile,

storing the applicable advertisements;

5 inserting the applicable advertisements within advertisement opportunities in delivered program streams.

51. The method of claim 50, wherein said inserting includes inserting the applicable advertisements based on a queue.

52. The method of claim 50, wherein said presenting the targeted advertisements is performed by a PVR.

53. A method for targeting advertisements to subscribers of a television delivery  
15 system, wherein the targeted advertisements are presented in advertisement opportunities within television program streams, the method comprising

monitoring subscriber interactions with a television;

aggregating the monitored subscriber interactions to generate viewing characteristics that identify traits associated with the subscribers but do not identify raw interaction data;

20 predicting subscriber traits not related to the subscriber interactions with the television by applying heuristic rules associated with the viewing characteristics;

creating subscriber profiles by combining at least some subset of the viewing characteristics and the subscriber traits;

receiving advertisement profiles that identify traits and characteristics of an intended target market of associated advertisements and a minimum correlation threshold;

5 correlating the advertisement profiles and the subscriber profiles;

identifying the subscribers meeting the correlation threshold for each of the associated advertisements as a target group; and

targeting the associated advertisements to the target groups.

10 54. The method of claim 53, wherein the predicted subscriber traits include demographic traits.

15 55. The method of claim 53, further comprising gathering additional subscriber characteristics from at least one external database, and wherein said creating subscriber profiles includes creating subscriber profiles by combining at least some subset of the viewing characteristics and the subscriber traits with at least some subset of the additional subscriber characteristics.

20 56. The method of claim 55, wherein said additional subscriber characteristics include at least a subset of purchasing and transaction characteristics.

57. The method of claim 53, further comprising gathering additional subscriber traits from at least one external database, and wherein said creating subscriber profiles includes creating subscriber profiles by combining at least some subset of the viewing characteristics and the subscriber traits with at least some subset of the additional subscriber traits.

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58. The method of claim 57, wherein said additional subscriber traits include at least a subset of demographic and interest traits.

59. The method of claim 53, further comprising gathering deterministic information about subscriber traits and characteristics from the subscribers via questionnaires or surveys, and wherein said creating subscriber profiles includes creating subscriber profiles by combining at least some subset of the viewing characteristics and the subscriber traits with at least some subset of the deterministic information.

60. The method of claim 53, further comprising generating a node profile by averaging the subscriber profiles for each subscriber connected to the node; and wherein said correlating includes correlating the advertisement profiles and the node profiles; and said identifying the subscribers includes identifying the nodes meeting the correlation threshold for each of the associated advertisements as a target group.

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61. A method for forming groups of subscribers within a television delivery system for the purpose of receiving targeted advertisements within advertisement opportunities in television program streams, the method comprising

retrieving demographic information for subscribers;

5 associating the demographic information of the subscribers with particular nodes of the television delivery system;

creating a demographic profile of the nodes by averaging the demographic information for each subscriber connected to the node; and

grouping the nodes based on a correlation associated with the demographic node profiles.

62. The method of claim 61, wherein said grouping includes correlating each demographic node profile with each of the other demographic node profiles and combining the nodes having the most similar correlation into groups.

15 63. The method of claim 61, wherein said grouping includes correlating each demographic node profile with at least one advertisement profile and combining the nodes having the most correlation with each of the at least one advertisement profiles into groups.

64. The method of claim 61, further comprising

20 retrieving characteristic information about the subscribers;

associating the characteristic information for the subscribers with the nodes of the television delivery system;

creating a characteristic profile of the nodes by averaging the characteristic information for each subscriber connected to the node; and

5        creating overall node profiles as an aggregation of at least some subset of the node characteristic profiles and the node demographic profiles; and wherein

said grouping the nodes includes grouping the nodes based on a correlation associated with the overall node profiles.

65.     The method of claim 64, wherein said retrieving characteristic information about the subscribers includes

monitoring subscriber interactions with a television; and

aggregating the monitored subscriber interactions to generate viewing characteristics that identify traits associated with the subscribers but do not identify raw interaction data.

66.     The method of claim 64, wherein the characteristic information includes at least some subset of viewing characteristics, purchase characteristics and transaction characteristics.

67.     A system for targeting ads to one or more subscribers in a privacy protected  
20    manner, the system comprising:

one or more databases storing information about subscribers, wherein the information includes at least a subset of transaction data, public data, private data, and demographic data;

a secure profiling server for generating at least one profile for the subscribers based on at least a subset of information stored in the one or more databases, wherein the subscriber profiles predict traits about the subscribers without revealing any private data or raw transaction data associated with the subscribers; and

a secure correlation server for correlating the subscriber profiles with advertisement profiles and selecting targeted advertisements based on said correlating.

68. The system of claim 67, wherein said secure profiling server also forms groups of subscribers having similar profiles.

69. The system of claim 68, wherein said secure profiling server also generates group profiles by averaging the subscriber profiles for all subscribers with a group.

70. The system of claim 67, wherein said secure correlation server also forms groups of subscribers having profiles similar to the advertisement profiles.

71. The system of claim 67, further comprising a viewing characteristics and profiling system for monitoring subscriber viewing activities, aggregating the viewing activities to



generate viewing characteristics and storing the viewing characteristics in one of the one or more databases.

72. The system of claim 71, wherein said viewing characteristics and profiling system also applies heuristic rules associated with the viewing characteristics to generate a subscriber profile that predicts traits about the subscriber that are not captured in the viewing characteristics.

72. The system of claim 67, wherein said secure profiling server generates the profiles for the subscribers in the form of a ket vector.

73. The system of claim 72, wherein the ket vector is represented by:

$$|A\rangle = (a_1\rho_1 + a_2\rho_2 + \dots a_n\rho_n)$$

$$+ (b_1\sigma_1 + b_2\sigma_2 + \dots b_n\sigma_n)$$

$$+ \dots$$

$$+ (m_1\omega_1 + m_2\omega_2 + \dots m_n\omega_n)$$

wherein  $a_1$  through  $m_n$  represent weighting factors and  $\rho_1$  through  $\omega_n$  are identification factors selected from at least a subset of viewing characteristics, purchasing characteristics, transaction characteristics, statistical information and deterministic information.

74. The system of claim 67, further comprising an advertisement insertion server for inserting at least one ad in place of each default ad in program streams to generate at least one presentation stream.

5 75. An apparatus, coupled to a television, for presenting targeted advertisements to a subscriber on the television, the apparatus comprising:

memory;

an interface to a television network;

a profile processor capable of

monitoring subscriber interactions with the television;

aggregating the monitored subscriber interactions to generate viewing characteristics that identify traits associated with the subscriber but do not identify raw interaction data; and

creating a subscriber profile by combining at least some subset of the viewing characteristics with subscriber traits; and

15 a correlation processor capable of

correlating ad profiles for the subscriber profile; and

selecting an appropriate advertisements based on the correlation.

76. The apparatus of claim 74, wherein said profile processor is further capable of  
20 predicting subscriber traits not related to the subscriber interactions with the television by applying heuristic rules associated with the viewing characteristics.

77. The apparatus of claim 75, wherein said interface receives multiple presentation streams and ad profiles associated with the advertisements within the presentation streams, and  
5 said correlation processor selects the appropriate presentation stream.

78. The apparatus of claim 75, wherein said interface receives advertisements and ad profiles on a separate channel, said correlation processor determines which ads are applicable, and said memory stores the applicable ads.

79. The apparatus of claim 75, wherein said interface receives targeted advertisements on a separate channel, said memory stores the targeted ads, and further comprising an ad inserter for inserting the targeted ads.

80. The apparatus of claim 79, wherein said inserter can insert the targeted ads within live broadcasts or recorded programming.